

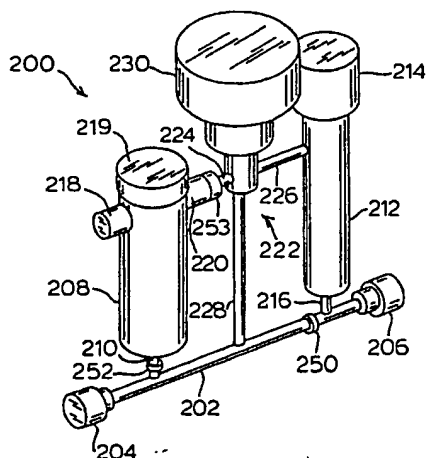
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(54) Title: **IN-LINE DETECTOR SYSTEM FOR REAL-TIME DETERMINATION OF IMPURITY CONCENTRATION IN A FLOWING GAS STREAM**



(57) Abstract

An in-line detector system (100) for real-time detection of impurity concentration in a flowing gas stream in which purified and unpurified volumes of gas from the flowing gas stream are subjected to concentration sensing, to determine a corrected impurity concentration value for the flowing gas stream. The system in a preferred embodiment employs a manifold (222) in flow communication with a purifier unit (208), a main flow conduit (202) through which the flowing gas stream is passed, and a sensor port (212), with a selectively positionable valve (230) to flow gas through a purifier loop (210, 224) of the manifold to the sensing port (212), and alternately through a bypass loop (226, 228) of the manifold without passage through the purifier unit, for comparative impurity sensing of gas in the respective loops. The system may utilize hygrometric sensors in the case of water as a critical impurity, or surface acoustical wave (SAW) devices coated with suitable impurity-affinity coatings. The system has particular utility in monitoring low impurity concentration levels (e.g., from about 0.1 ppm to about 100 ppm) in gas streams employed in vapor-phase processes such as chemical vapor deposition in the manufacture of semiconductor devices.

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